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WMO GREENHOUSE GAS BULLETIN 2008

MAIN GREENHOUSE GASES REACH HIGHEST LEVEL EVER SINCE PRE-INDUSTRIAL TIME

23 November 2009 (WMO) - Levels of most greenhouse gases continue to increase. In 2008, global concentrations of carbon dioxide, methane and nitrous oxide, which are the main long-lived greenhouse gases in the atmosphere, have reached the highest levels recorded since pre-industrial times. Since 1990, the overall increase in radiative forcing caused by all long-lived greenhouse gases is 26% and the increase was 1.3% from 2007 to 2008. These latest figures, published today in the World Meteorological Organization's (WMO) 2008 Greenhouse Gas Bulletin, confirm the continued trend of rising atmospheric burdens of greenhouse gases since 1750.

Greenhouse gases trap radiation within the Earth's atmosphere causing it to warm. Human activities, such as fossil fuel burning and agriculture, are major emitters of greenhouse gases which scientists widely recognize as drivers of global warming and climate change. After water vapour, the four most prevalent long-lived greenhouse gases in the atmosphere that are directly influenced by humans are carbon dioxide, methane, nitrous oxide and halocarbons. WMO, through its Global Atmosphere Watch (GAW) Programme, coordinates the observations of these gases in the atmosphere through a network of stations located in more than 50 countries.

The globally averaged mixing ratio of carbon dioxide (CO_2) in 2008 was 385.2 ppm (number of molecules of the gas per million molecules of dry air), with an increase of 2.0 ppm from the previous year, continuing the tendency of exponential increase. CO_2 is the most important human-emitted greenhouse gas in the atmosphere, contributing 63.5% to the increase in overall radiative forcing since 1750. Its atmospheric abundance was nearly constant at about 280 ppm before industrialization. During the time period 1979-1984 CO_2 contributed 56% of the increase in radiative forcing caused by long-lived greenhouse gases. Since then CO_2 has gained importance and during the five-year period from 2003 to 2008 CO_2 was responsible for 86% of the increase in radiative forcing, which is more than four times superior to all other long-lived greenhouse gases combined. Since 1750, atmospheric CO_2 has increased by 38%, primarily because of emissions from combustion of fossil fuels, deforestation and land use change.

The globally averaged mixing ratio of methane (CH_4) in 2008 was 1797 ppb, which means an increase of 7ppb from the previous year. While the concentration of CH_4 was stable for seven years (from 1999 to 2006), both 2007 and 2008 show a significant increase. Methane contributes 18.2% to the increase in overall global radiative forcing since 1750. 60% of CH_4 emissions come from anthropogenic sources such as ruminants, rice agriculture, fossil fuel exploitation, landfills and biomass burning. Before the industrial era, atmospheric methane was about 700 ppb. Increasing emissions from anthropogenic sources are responsible for the 157% increase in the CH_4 concentration since 1750.

The globally averaged mixing ratio of nitrous oxide (N_2O) in 2008 was 321.8 ppb, 0.9 ppb higher than in 2007, and 19% above the pre-industrial level. N_2O contributes 6.2% to the increase in the overall global radiative forcing since 1750. The atmospheric abundance of N_2O prior to industrialization was 270 ppb. N_2O is emitted into the atmosphere from natural and anthropogenic sources, including oceans, soil, biomass burning, fertiliser use and various industrial processes.

The combined radiative forcing by halocarbons is nearly double that of N_2O. Some halocarbons such as chlorofluorocarbons (CFCs), previously used as refrigerants, as propellants in spray cans and as solvents, are decreasing slowly as a result of the phase-out of these compounds through the Montreal Protocol on Substances that Deplete the Ozone Layer. However, concentrations of other gases such as HCFCs and

HFCs, which are used to substitute chlorofluorocarbons, are increasing rapidly. These two classes of compounds are very potent greenhouse gases and together with sulphur hexafluoride (SF_6) they contributed 8.9% to the increase in radiative forcing from 2003 to 2008, which is more than the contribution from N_2O during this period.

This year's Greenhouse Gas Bulletin is the fifth in the series, reporting data since 2004. The Bulletins provide critical information on the global state of the atmosphere in a concise manner and highlight recent accomplishments of research and technology application. The 2008 Bulletin precedes the 15th session of the United Nations Framework Convention on Climate Change (Copenhagen, 7-18 December 2009)

WMO prepares and distributes the annual Greenhouse Gas Bulletins in cooperation with the GAW Scientific Advisory Group for Greenhouse Gases. The measurement data are archived and distributed by WMO's World Data Centre for Greenhouse Gases (WDCGG), hosted by the Japan Meteorological Agency (JMA).

For more information:

The 2008 Bulletin, translated in all UN languages, as well as earlier issues, are available through the WMO GAW Programme Web page at the following URL:
http://www.wmo.int/gaw

A 3 minutes video on greenhouse gases, featuring an interview with Mr. Len Barrie, Director of the Research Department at WMO, is available online:
http://www.wmo.int/pages/resources/multimedia/greenhousegases.html

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